

Claims

What is claimed is:

1. A method for scheduling data for transmission during a transmit time interval in a multi-carrier communication environment comprising:
  - determining channel condition indicia for a plurality of users;
  - in an iterative manner:
    - pre-assigning select OFDM tones for each remaining user of the plurality of users that has not been permanently assigned tones for the transmit time interval;
    - selecting a remaining user having least favorable channel conditions as an active user; and
    - permanently assigning to the active user the select OFDM tones pre-assigned to the active user, wherein once the select OFDM tones are permanently assigned to the active user, the active user is no longer a remaining user.
2. The method of claim 1 wherein the select tones permanently assigned to active users are no longer available for pre-assignment to the remaining users.
3. The method of claim 1 further comprising initiating scheduling for the transmit time interval for the plurality of users using the select tones permanently assigned to each of the plurality of users.
4. The method of claim 1 wherein for each remaining user, pre-assigning the select tones comprises:
  - sorting tones in light of channel condition information; and
  - selecting ones of the tones having most favorable channel conditions as the select tones.
5. The method of claim 4 wherein for each remaining user, selecting ones of the tones further comprises minimizing a number of tones pre-assigned as select tones while ensuring a target data rate is achieved

in light of the channel conditions associated with each of the select tones.

6. The method of claim 1 further comprising:
  - determining a number of the select tones for transmitting original data and a number of the select tones for transmitting redundant data; and
  - increasing the number of the select tones for transmitting redundant data for remaining users with poor channel conditions.
7. The method of claim 1 wherein selecting a remaining user further comprises:
  - determining a scheduling factor for each remaining user based on the channel condition indicia; and
  - selecting the remaining user having the least favorable scheduling factor as the active user.
8. The method of claim 1 wherein the data scheduled for transmission is real-time data.
9. The method of claim 1 wherein the data scheduled for transmission is voice information.
10. The method of claim 1 wherein groups of the tones with a time and frequency continuum associated with the transmit time interval are associated with channels, and the tones are pre-assigned to the remaining users and permanently assigned to the active users according to corresponding channels.
11. The method of claim 1 wherein groups of tones are associated, and further comprising effecting signaling for scheduling based on the groups of tones to reduce signaling overhead.

12. The method of claim 1 wherein the number of tones pre-assigned to remaining users increases with each re-transmission attempt.
13. The method of claim 1 wherein the multi-carrier communication environment is an orthogonal frequency division multiplexing (OFDM) communication environment and the tones are OFDM tones.
14. A system for scheduling data for transmission during a transmit time interval in a multi-carrier communication environment comprising:
- a communication interface;
  - a network interface; and
  - a control system associated with the communication interface and the network interface, the control system adapted to:
    - determine channel condition indicia for a plurality of users; and
    - in an iterative manner:
      - pre-assigning select tones for each remaining user of the plurality of users, which have not been permanently assigned tones for the transmit time interval;
      - selecting a remaining user having least favorable channel conditions as an active user; and
      - permanently assigning to the active user the select tones pre-assigned to the active user wherein once the select tones are permanently assigned to the active user, the active user is no longer a remaining user.
15. The system of claim 14 wherein the select tones permanently assigned to active users are no longer available for pre-assignment to the remaining users.
16. The system of claim 14 wherein the control system is further adapted to initiate scheduling for the transmit time interval for the plurality of users using the select tones permanently assigned to each of the plurality of users.

17. The system of claim 14 wherein for each remaining user, to pre-assign the select tones, the control system is further adapted to:
- sort tones in light of channel condition information; and
  - select ones of the tones having most favorable channel conditions as the select tones.
18. The system of claim 17 wherein for each remaining user, to select ones of the tones, the control system is further adapted to minimize a number of tones pre-assigned as select tones while ensuring a target data rate is achieved in light of the channel conditions associated with each of the select tones.
19. The system of claim 14 wherein the control system is further adapted to:
- determine a number of the select tones for transmitting original data and a number of the select tones for transmitting redundant data; and
  - increase the number of the select tones for transmitting redundant data for remaining users with poor channel conditions.
20. The system of claim 14 wherein to select a remaining user, the control system is further adapted to:
- determine a scheduling factor for each remaining user based on the channel condition indicia; and
  - select the remaining user having the least favorable scheduling factor as the active user.
21. The system of claim 14 wherein the data scheduled for transmission is real-time data.
22. The system of claim 14 wherein the data scheduled for transmission is voice information.

23. The system of claim 14 wherein groups of the tones with a time and frequency continuum associated with the transmit time interval are associated with channels, and the tones are pre-assigned to the remaining users and permanently assigned to the active users according to corresponding channels.
24. The system of claim 14 wherein groups of tones are associated, and further comprising effecting signaling for scheduling based on the groups of tones to reduce signaling overhead.
25. The system of claim 14 wherein the number of tones pre-assigned to remaining users increases with each re-transmission attempt.
26. The system of claim 14 wherein the multi-carrier communication environment is an orthogonal frequency division multiplexing (OFDM) communication environment, and the tones are OFDM tones.